Complete Summary

GUIDELINE TITLE

Prevention of ventilator-associated pneumonia. In: Prevention and control of healthcare-associated infections in Massachusetts.

BIBLIOGRAPHIC SOURCE(S)

Prevention of ventilator associated pneumonia. In: Betsy Lehman Center for Patient Safety and Medical Error Reduction, JSI Research and Training Institute, Inc. Prevention and control of healthcare-associated infections in Massachusetts. Part 1: final recommendations of the Expert Panel. Boston (MA): Massachusetts Department of Public Health; 2008 Jan 31. p. 56-60.

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Ventilator-associated pneumonia
- Hospital-acquired pneumonia

GUIDELINE CATEGORY

Prevention

CLINICAL SPECIALTY

Critical Care
Infectious Diseases

Internal Medicine
Pediatrics
Preventive Medicine
Pulmonary Medicine

INTENDED USERS

Advanced Practice Nurses
Hospitals
Nurses
Physician Assistants
Physicians
Respiratory Care Practitioners

GUIDELINE OBJECTIVE(S)

- To provide evidence-based recommendations for a statewide infection control and prevention program to improve health outcomes by reducing the risk of acquiring and transmitting healthcare-associated infections
- To provide recommendations for prevention of ventilator-associated pneumonia

TARGET POPULATION

Adult and pediatric patients receiving mechanical ventilation

INTERVENTIONS AND PRACTICES CONSIDERED

1. General prophylaxis
2. Measures to achieve safe mechanical ventilation
3. Measures to prevent aspiration
4. Selective use of antibiotics to control outbreaks

   Note: Routine use of oral and systemic antibiotics was considered but not recommended.

5. Oral care with antiseptic agents
6. Daily interruptions or lightening of sedation and avoidance of paralytic agents
7. Gastrointestinal bleeding prophylaxis with either H_2 antagonists or sucralfate
8. Transfusion of red blood cell and other allogeneic blood products in selected patients
9. Insulin therapy if indicated

MAJOR OUTCOMES CONSIDERED

- Length of stay in intensive care unit (ICU)
- Morbidity and mortality
- Incidence of healthcare-associated infections

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The Expert Panel was divided into six task groups. In order to generate sound, evidence-based recommendations, a comprehensive reference library was created for each task group comprising articles, publications, and other materials relevant to their work. An expert in library science, aided by a JSI Research and Training Institute, Inc. (JSI) staff member with experience in literature review, conducted literature searches, selected articles for inclusion, and managed and organized the task group libraries. For the purpose of the project, JSI gathered an extensive body of literature (over 2000 published articles). Starting with the reference library of a local healthcare associated infections (HAI) expert, it was supplemented and updated to include the most current articles and expanded on recommendations made by Expert Panel and task group members. Figure 1 in the original guideline document summarizes the literature review process.

Literature searches were conducted in PubMed using applicable Medical Subject Headings (MeSH) and key words. Refer to Figure 2 in the original guideline document for information on literature search methodology.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Level of Evidence Ranking

Level I: Strong evidence from at least one well-designed randomized controlled trial

Level II: Evidence from well-designed non-randomized trials; cohort or case-controlled analytic studies (preferably from >1 center); multiple time-series studies

Level III: Well-designed descriptive studies from more than one center or research group

Level IV: Opinions of authorities (e.g., guidelines), clinical evidence; reports of expert committees

Level V: No quality studies found and no clear guidance from expert committees, authorities or other sources

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

To aid the task groups and Expert Panel in their decisions, JSI Research and Training Institute, Inc. (JSI) generated qualitative summaries and reviews of relevant literature, outlining the current "state of the science" on task group-indicated topics of debate. All selected studies were critically assessed for internal validity or methodological rigor and only those with high quality of evidence grades were considered in generating evidence-based recommendations.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)
Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The 2006 Health Care Reform Law directed the Massachusetts Department of Public Health (MDPH) to establish a comprehensive state wide infection prevention and control program. To direct this new effort, a healthcare-associated infection (HAI) Expert Panel was convened in November 2006 under the auspices of the Betsy Lehman Center for Patient Safety and Medical Error Reduction and MDPH. This multidisciplinary panel of experts included infectious disease specialists, epidemiologists, infection control and hospital quality professionals, consumers, professional organizations, and hospital executives and clinical leaders. Research, coordination and facilitation of the work of the Expert Panel and the associated Task Groups was provided by JSI Research and Training Institute, a public health research and consulting firm located in Boston.

The mission of the Expert Panel was to provide guidance on all aspects of a statewide infection control and prevention program, review the key elements of such a program, and submit their completed recommendations to the Betsy Lehman Center and the Massachusetts Department of Public Health by January 31, 2008.

The Expert Panel held twelve monthly meetings beginning on November 30, 2006. Due to the multi-faceted nature of the Panel's charge, six Task Groups were formed in order to focus the efforts of Panel members on their respective areas of expertise.

1. Bloodstream and Surgical Site Infections (BSI, SSI)--Prevention, Surveillance, and Reporting
2. Optimal Infection Control Program Components
3. Ventilator-Associated Pneumonia (VAP)--Prevention, Surveillance, and Reporting
4. Methicillin-Resistant *Staphylococcus aureus* (MRSA) and Other Selected Pathogens--Prevention, Surveillance, and Reporting
5. Public Reporting and Communication
6. Pediatric Affinity Group--Prevention, Surveillance, and Reporting

Panel members were asked to join at least one group, aligning with their expertise and interest. Additionally, group membership was supplemented with experts and stakeholders from outside the Expert Panel. Each task group was led by an Expert Panel member (Task Group Leader) who facilitated the calls and assisted in the literature review process. Task groups held one-hour-long conference calls every three weeks. A JSI coordinator supported each task group by reviewing and summarizing the literature and aiding in drafting recommendations. Coordinators were also responsible for all administrative work including minute taking, distribution of materials, and communication between the Expert Panel and task groups.

Due to time and capacity limitations, catheter-associated urinary tract infections (CAUTI) were not a specific task group topic. However, the product of a parallel process of evidence review and guideline updating, by experts representing the Infectious Disease Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA), was graciously made available to our project. An ad hoc committee of Expert Panel members and outside experts studied and endorsed these prevention guidelines and they have been incorporated into this final report.

Expert Panel recommendations, in addition to being scientifically sound, needed to take into account the current practices of infection control programs in Massachusetts. For this purpose, JSI surveyed infection control program directors across the Commonwealth in the areas of prevention, surveillance, reporting, and education relating to HAIs. The comprehensive survey questionnaire was developed using a review of current literature, expert reports, and existing surveys. After receiving input and approval from the Expert Panel and the Harvard Pilgrim Health Care Institutional Review Board, the survey was piloted in six hospitals. Once final revisions were made, the survey was mailed to the infection control program of all 71 acute care (non-Veterans Administration) hospitals in Massachusetts. A follow-up phone interview was also conducted to solicit more qualitative information and clarify any answers on the written survey. The completed survey responses were analyzed and results were distributed to project members to aid in their decision-making.

Taking into consideration both the results of the survey and the evidence, task groups drafted recommendations in the areas of HAI prevention and reporting. When voting, either during meetings or electronically, task group members had the opportunity to make comments and suggest additional changes. JSI then tallied the task group votes, reviewed comments, and brought back any major points of contention to the task group.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of Recommendation Ranking

Category A: Strongly recommended

Category B: Recommended for implementation

Category C: Consider for implementation

Category D: Recommended against implementation

Category UI: Unresolved issue

No recommendation: Unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

COST ANALYSIS

The annual economic burden of healthcare-associated infections (HAI) in Massachusetts ranges from approximately $200 million to well over $400 million. While it is difficult to determine a precise estimate, it is clear that these infections are costly. Mandatory reporting of institutional-level HAI is a potential tool for improvement of quality of care and a method to be used by consumers, insurers, or providers to make decisions regarding where to seek or fund healthcare. If HAI are reduced with mandatory reporting, societal cost-savings should be anticipated. However, the effect of mandatory reporting on HAI rates is yet unknown. Additionally, increased costs to the hospitals and the Department of Public Health (DPH) should be anticipated. The methods used in this report should be beneficial to other state DPH. With limited resources and the potential benefits of public reporting yet to be established, there is a need to carefully balance the additional burden of reporting with current prevention efforts in order to obtain the optimum outcome, less infections.

Refer to *Prevention and Control of Healthcare-Associated Infections in Massachusetts, Part 2: Findings from Complementary Research Activities* (see the "Availability of Companion Documents" field) for more information on cost-analysis.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Once recommendations were approved by the task group members, they were presented to the Expert Panel for consideration and any necessary final revisions.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from the Massachusetts Department of Public Health (MDPH) and the National Guideline Clearinghouse (NGC): *Prevention and Control of Healthcare-Associated Infections in Massachusetts* guideline has been divided into individual summaries. In addition to the current summary, the following are available:

- Hand hygiene recommendations
- Standard precautions in hospitals
- Contact precautions in hospitals
- Environmental measures for the prevention and management of multi-drug resistant organisms
- Prevention of surgical site infections
- Prevention of bloodstream infections
- Prevention of catheter-associated urinary tract infections

Level of evidence ranking (I – V) and strength of recommendation ranking (A – D, Unresolved issue [UI], No recommendation) definitions are presented at the end of "Major Recommendations" field.

General Prophylaxis

1. Effective infection control measures: staff education, compliance with alcohol-based hand disinfection, and isolation to reduce cross-infection with multi-drug resistant pathogens should be used routinely. ***A-I****
2. Surveillance of intensive care unit (ICU) infections and preparation of timely data for infection control and to guide appropriate antimicrobial therapy in patients with suspected ventilator-associated pneumonia (VAP) or other nosocomial infections are recommended. ***A-II****

Intubation and Mechanical Ventilation

3. Intubation and reintubation should be avoided, if possible, as it increases the risk of VAP. ***A-II*** (Elward, Warren, & Fraser, 2002)
4. Noninvasive ventilation should be used whenever possible in selected patients with respiratory failure. ***A-I*** (Burns, Adhikari, & Meade, 2003; Esteban et al., 2004)
    - 4-P**. Noninvasive ventilation should be ***considered*** whenever possible in pediatric patients with respiratory failure. ***A-IV****

5. Orotracheal intubation and orogastric tubes are preferred over nasotracheal intubation and nasogastric tubes to prevent nosocomial sinusitis and to reduce the risk of VAP, although direct causality has not been proved. ***B-II*** (Holzapfel, 2003)
    - 5-P**. Orotracheal intubation and orogastric tubes are preferred, particularly for emergency situations. Depending on particular circumstances related to age and indication, nasotracheal intubation can be considered as well. When inserting endotracheal tubes, "clean"

technique should be followed (i.e., hand hygiene, gloves, face shield, with equipment placed on sterile drape). ***B-IV****

6. Oral and subglottic secretions are important contributors to the development of VAP, and hospitals should develop policies and procedures for the management of these secretions. These policies and procedures should include scheduled oral care and intermittent (i.e., at regular intervals and when repositioning the patient or tube) or continuous suctioning of subglottic secretions. ***A-I*** (Dezfulian et al., 2005; Girou et al., 2004; Bercault et al., 2005; Kollef et al., 1997)
    - 6-P**. Oral and subglottic secretions are important contributors to the development of VAP, and hospitals should develop policies and procedures for the management of these secretions. These policies and procedures should include scheduled oral care and intermittent suctioning in pediatric patients (i.e., at regular intervals and when repositioning the patient or tube). ***A-II*** (Curley et al., "Tailoring the Institute for Health," 2006)

7. The endotracheal tube should be of proper size and cuff pressure should be maintained at the minimal occluding volume to prevent leakage of bacterial pathogens around the cuff into the lower respiratory tract without inducing tracheal injury. ***B-II*** (Young et al., 2006; Macchiarini et al., 2000)
    - 7-P**. Data in pediatrics about the role of cuffed endotracheal tubes (ETT) in the prevention of VAP is limited. However, the use of cuffed ETTs outside the neonatal intensive care units is recommended. The ETT should be of proper size and cuff pressure should be monitored and maintained to achieve minimal occluding volume. ***B-III*** (Newth et al., 2004; Weiss, Gerber, & Dullenkopf, 2005)

8. Contaminated condensate should be carefully emptied from ventilator circuits and condensate should be prevented from entering either the endotracheal tube or inline medication nebulizers. ***A-II*** (Hess et al., 2003; Boots et al., 2006; Pediatric Affinity Group 2007).
9. Passive humidifiers or heat–moisture exchangers decrease ventilator circuit colonization, but have not consistently reduced the incidence of VAP, and thus they cannot be regarded as a pneumonia prevention tool. ***B-I*** (Kola, Eckmanns, & Gastmeier, 2005; Lacherade et al., 2005; Lorente et al., 2006)
10. Reduced duration of intubation and mechanical ventilation may prevent VAP and can be achieved by protocols to improve the use of sedation and to accelerate weaning. ***A-II*** (Kollef, 2004; Dries et al., 2004; Schweickert et al., 2004; Randolph et al., 2002)

Aspiration, Body Position, and Enteral Feeding

11. Patients should be kept in the semirecumbent position (30 to 45 degrees) rather than supine to prevent aspiration, especially when receiving enteral feeding. The degree of elevation should be measured (using validated instruments or bed markings) and documented every 8 hours. Before lowering the patient's head less than to 30% (e.g., when transporting or repositioning), secretions should be suctioned above and below the cuff to prevent microaspiration. ***A-I*** (van Nieuwenhoven et al., 2006; Grap et al., 2005)

- 11-P**. Data in pediatrics is very limited. However, intubated infants and children should have their head elevated 30 to 45 degrees. Ideal positioning of intubated neonates is 15 to 30 degrees head elevation and cribs with adequate positioning features to achieve this should be used. The degree of elevation should be measured (using validated instruments or bed markings) and documented every 8 hours. Before lowering the patient's head (e.g., when transporting or repositioning), secretions should be suctioned above and below the cuff (if used) to prevent microaspiration. ***A-IV*** (Curley et al., "Tailoring the Institute for Health," 2006; Pediatric Affinity Group, 2007).

12. Enteral nutrition is preferred over parenteral nutrition to reduce the risk of complications related to central intravenous catheters and to prevent reflux villous atrophy of the intestinal mucosa that may increase the risk of bacterial translocation. ***A-I*** (Bowman et al., 2005; Metheny et al, 2006; Artinian, Krayem, & DiGiovine, 2006)
    - 12-P**. Enteral nutrition, either gastric or post-pyloric, is preferred over parenteral nutrition to reduce the risk of healthcare associated infections and to prevent reflux villous atrophy of the intestinal mucosa that may increase the risk of bacterial translocation. ***A-I****

Modulation of Colonization: Oral Antiseptics and Antibiotics

13. Although in some short-term studies routine prophylaxis of hospital-acquired pneumonia (HAP) with oral antibiotics (selective decontamination of the digestive tract or SDD), with or without systemic antibiotics, reduced the incidence of ICU-acquired VAP and has helped contain outbreaks of multi-drug resistant bacteria, it should be used selectively to control outbreaks and is NOT recommended for routine use. ***B-II*** (Kallet & Quinn, 2005; Liberati et al., 2006; Kollef, 2003; Heininger et al., 2006; de Jonge, 2005)
    - 13-P**. Prophylaxis of HAP with oral antibiotics or selective decontamination of the digestive tract is NOT recommended for routine use. ***B-IV****

14. Prophylactic administration of systemic antibiotics for 24 hours at the time of emergent intubation has been demonstrated to prevent ICU-acquired HAP in comatose and closed head injury patients, but its routine use is not recommended until more data on mortality and antibiotic resistance become available. ***B-II*** (Acquarolo et al., 2005)
    - 14-P**. Prophylactic administration of systemic antibiotics for 24 hours at the time of emergent intubation is not recommended for routine use. ***B-IV****

15. There is consistent evidence that the use of oral care with antiseptic agents (but not oral antibiotics) can decrease the incidence of ventilator-associated pneumonia, although not the overall ICU length of stay or overall mortality. However, the optimal concentration and formulation of antiseptic agents to use for oral care remains unresolved, as does the optimal timing of oral care. Pending further data, at this time the panel recommends that health care facilities incorporate the regular use of an oral antiseptic agent into the routine care of patients receiving mechanical ventilation. ***B-I*** (Chlebicki &

Safdar, 2007; Mori et al., 2006; Koeman et al., 2006; Segers et al., 2006; Fourrier et al., 2005)

- 15-P**. Oral hygiene (removal of plaque from teeth and gums) is recommended at least every 12 hours. Oral care (removal of secretions from the oropharynx and moisturizing the mouth and lips) is recommended every 4 hours and before any manipulation of the ETT or position change of the ventilated patient. There are currently no data evaluating the safety or efficacy of oral antiseptic agents in the pediatric population, although their use can be considered. ***B-IV*** (Curley et al., "Tailoring the Institute for Health," 2006)

16. Use daily interruption or lightening of sedation to avoid constant heavy sedation and try to avoid paralytic agents, both of which can depress cough and thereby increase the risk of HAP. ***A-II*** (Schweickert et al., 2004; Kress et al., 2003; Kress et al., 2007)
    - 16-P**. Use daily interruption of paralytic drugs and lightening of heavy sedation to avoid prolonged suppression of muscle tone and diaphragm function, which contribute to the retention of pulmonary secretions. The patient's capacity for unassisted breathing should be evaluated daily. Extubation readiness testing and the use of sedation protocols may be beneficial in critically ill pediatric patients but must be balanced against the risk of premature and self-extubation. ***A-III*** (Curley et al., "Tailoring the Institute for Health," 2006; Pediatric Affinity Group, 2007; Curley et al., "State Behavioral Scale," 2006)

Stress Bleeding Prophylaxis, Transfusion, and Hyperglycemia

17. Comparative data from randomized trials suggest a trend toward reduced VAP with sucralfate, but there is a slightly higher rate of clinically significant gastric bleeding, compared with H2 antagonists. If needed, stress bleeding prophylaxis with either H2 antagonists or sucralfate is acceptable. There is limited information on the use of proton pump inhibitors for stress ulcer prophylaxis, but evidence suggests that these agents may increase the risk of *Clostridium difficile* disease. Pending additional data, proton pump inhibitor agents should not be used solely for stress ulcer prophylaxis in the ICU setting. ***B-II*** (Bornstain et al., 2004; Metz, 2005)
    - 17-P**. Gastrointestinal bleeding prophylaxis with either H2 antagonists or sucralfate does not appear to alter the risk for VAP. There is limited information on the use of proton pump inhibitors for stress ulcer prophylaxis, but evidence suggests that these agents may increase the risk of *Clostridium difficile* disease. Pending additional data, proton pump inhibitor agents should not be used solely for stress ulcer prophylaxis in the ICU setting. ***B-IV*** (Pediatric Affinity Group, 2007; Lopriore, Markhorst, & Gemke, 2002; Yildizdas, et al., 2002)

18. Transfusion of red blood cell and other allogeneic blood products should follow a restricted transfusion trigger policy; leukocyte-depleted red blood cell transfusions can help to reduce HAP in selected patient populations. ***A-I*** (Shorr et al., 2004; Levy et al., 2005; Lacroix et al., 2007)
19. To reduce nosocomial blood stream infections, duration of mechanical ventilation, ICU stay, and morbidity, intensive insulin therapy has been recommended. However, intensive insulin is also associated with an increased

risk of hypoglycemia and most trials do not show a mortality benefit. Although data are still accumulating, insulin therapy should probably be used to maintain serum glucose levels between 100 and 150 mg/dL in most critically ill patients. More stringent control (between 80 and 110 mg/dL) can be considered in post-cardiac surgery patients. ***B-II*** (Gandhi et al., 2007; Van den Berghe, 2007; Van den Berghe et al., "Intensive insulin therapy in the medical ICU," 2006; Malhotra, 2006; Egi et al., 2006; Van den Berghe et al., "Intensive insulin therapy in mixed medical/surgical intensive care units," 2006; Mitchell et al., 2006)

- 19-P**. Tight glycemic control may be beneficial in critically ill pediatric patients, but specific target ranges have not been studied. The risk must be balanced against the risk for unrecognized hypoglycemia as a result of insulin therapy. ***UI***

*Identifies evidence from the Centers for Disease Control and Prevention (CDC)'s updated guidelines without repeating the detailed literature review process.

**Pediatric. The Pediatric Affinity Group was charged with reviewing recommendations of the other Task Groups to identify areas where specific modifications were needed to make the statements applicable to neonates, infants and/or children. After a review of the pediatric literature, the group amended the general/adult statements and determined the strength of recommendations. These revisions are designated with the original number of the statement they relate to, followed by P.

***Identifies pediatric statements in which only the adult evidence cited by the source guideline was used.

Definitions:

Level of Evidence Ranking

Level I: Strong evidence from at least one well-designed randomized controlled trial

Level II: Evidence from well-designed non-randomized trials; cohort or case-controlled analytic studies (preferably from >1 center); multiple time-series studies

Level III: Well-designed descriptive studies from more than one center or research group

Level IV: Opinions of authorities (e.g., guidelines), clinical evidence; reports of expert committees

Level V: No quality studies found and no clear guidance from expert committees, authorities or other sources

Strength of Recommendation Ranking

Category A: Strongly recommended

Category B: Recommended for implementation

Category C: Consider for implementation

Category D: Recommended against implementation

Category UI: Unresolved issue

No recommendation: Unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Evidence-based best practice guidelines and interventions for prevention of healthcare-associated infection will promote patient and healthcare worker safety and improve health outcomes by reducing the risk of acquiring and transmitting healthcare associated infections.

POTENTIAL HARMS

Intensive insulin is associated with an increased risk of hypoglycemia.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The final recommendations contained in *Prevention and Control of Healthcare-Associated Infections in Massachusetts* were adopted by the Betsy Lehman Center for Patient Safety and Medical Error Reduction (BLC) and the Massachusetts Department of Public Health (MDPH). MDPH incorporated the recommendations into the reporting requirements, and developed an assessment tool for surveyors to use to evaluate the implementation of best practices.

IMPLEMENTATION TOOLS

Staff Training/Competency Material

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Prevention of ventilator associated pneumonia. In: Betsy Lehman Center for Patient Safety and Medical Error Reduction, JSI Research and Training Institute, Inc. Prevention and control of healthcare-associated infections in Massachusetts. Part 1: final recommendations of the Expert Panel. Boston (MA): Massachusetts Department of Public Health; 2008 Jan 31. p. 56-60.

ADAPTATION

The guideline was adapted from: American Thoracic Society. Guidelines for the Management of Adults with Hospital-acquired, Ventilator-associated, and Healthcare-associated Pneumonia. Am J Respir Crit Care Med. 2005; 171: 388-416.

DATE RELEASED

2008 Jan 31

GUIDELINE DEVELOPER(S)

Betsy Lehman Center for Patient Safety and Medical Error Reduction - State/Local Government Agency [U.S.]
Massachusetts Department of Public Health - State/Local Government Agency [U.S.]

SOURCE(S) OF FUNDING

Massachusetts Department of Public Health

GUIDELINE COMMITTEE

Massachusetts Healthcare-Associated Infections Expert Panel

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Massachusetts Department of Public Health Web site.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Betsy Lehman Center for Patient Safety and Medical Error Reduction, JSI Research and Training Institute, Inc. Prevention and control of healthcare-associated infections in Massachusetts. Part 2: findings from complementary research activities. Boston (MA): Massachusetts Department of Public Health; 2008 Jan 31. 131 p. Available in Portable Document Format (PDF) from the Massachusetts Department of Public Health Web site.
- Handwashing education materials for health care professionals. Available from the Massachusetts Department of Public Health Web site.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on October 22, 2008. The information was verified by the guideline developer on December 22, 2009.

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